

06 February 2025

Regis Aged Care Pty Ltd  
53-59 Gloucester Road  
Hurstville NSW 2220

Attention: Michael Robinson

Dear Michael,

## Regis Belrose Residential Aged Care Facility – 181 Forest Way, Belrose

### Council Engineering OSD Referral Response

This letter is prepared in response to the Northern Beaches Council (Council) request for additional information (RFI) engineering referral letter dated 15.11.2024.

The referral response states that the development proposal is not supported and have provided the following comments;

*The Statement of Modification and associated documents, including the Stormwater Management plans have been reviewed. The proposed development is on a Low Level Property that cannot drain to the street. It is noted that the original approved plans by Acor Consultants dated 10.09.18 proposed a 240 cubic metre OSD system with a 250 mm orifice. The amended plans by Entec Consultants propose a reduced volume of 125 cubic metres. The design criteria on drawing C512 is not compliant with Council's Water Management for Development Policy. Amended on-site detention design is required in accordance with Section 5.5 and Appendix 3 of the policy.*

Our response to the referral comments is below.

#### 1) Non-Compliance to Council's Water Management for Development Policy

We have reviewed the current design against the Council's Water Management for Development Policy and do note that a minor inconsistency is apparent. The policy states that the pre-development impervious area is to be 0% and therefore considered to be back to its 'natural' state, ie grass and trees.

Our current design has a pre-development impervious percentage of 13% which considers the existing house and pavement.

We have therefore amended the design to be consistent with the Council policy, refer update drawing C512 in Appendix A.

Notwithstanding this change has an insignificant effect on the proposed OSD design. The pre-development flows are still maintained within the proposed OSD volume of 125m<sup>3</sup> with minor adjustments to the tank configuration.

The revised flow rates and OSD adjustment are outlined below;

- Orifice diameter adjusted to 245mm, previously 250mm
- Wier wall height adjusted to RL159.47, previously RL159.40

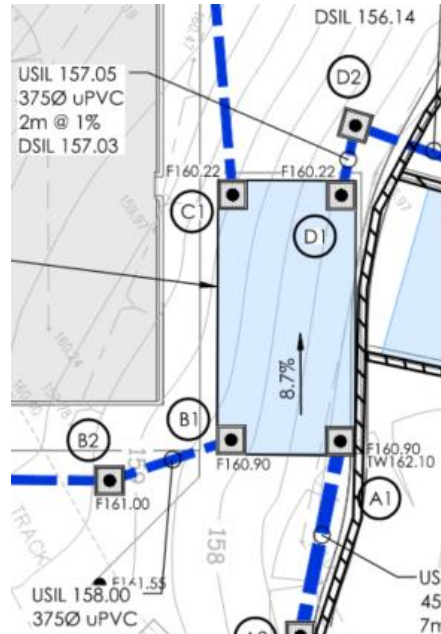
2) Reduced OSD volume compared to approved DA design by ACOR Consultants

Entec consultants were not provided with the ACOR Consultants DRAINS model and as such were required to recreate and remodel the site OSD.

Notwithstanding, the OSD tank is to be relocated from within the building's internal courtyard, as documented by ACOR, to outside the building footprint beneath the rear access road and as such the tank was required to be redesigned to suit the new location.



ACOR OSD Location beneath building



Proposed OSD tank location outside of building

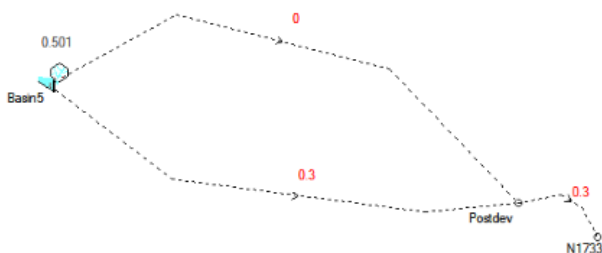
As noted above, Entec has not been provided the ACOR DRAINS model, however, a review of their design plans and report seem to indicate that the OSD was modelled using a single catchment node directed to the OSD.

The ACOR report states that an overflow route from the tank was used to model a staged dual orifice discharge relationship, refer image below, rather than modelling this in detail using dual orifice nodes in DRAINS. This staged relationship calculation has not been provided in their report or drawings and therefore cannot be verified by Entec. The design also appears to restrict the 1% AEP flows more than the required pre-development flows which could account for the additional storage volume needed to detain the flows.

APPENDIX C – Drains Model

The staged discharge relationship was inputted into an overflow path to model two orifices.

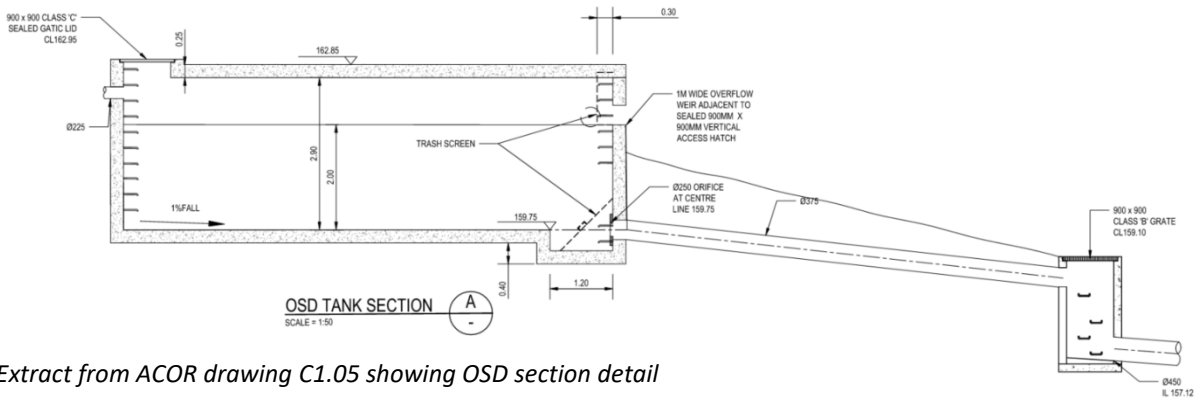
Figure 2 – Drains model



Storm events	Flows (L/s)
Q5 Pre-development	132
Q5 Post-development	125
Q20 Pre-development	222
Q20 Post-development	157
Q100 Pre-development	330
Q100 Post-development	300

Extract from ACOR stormwater management report Appendix C

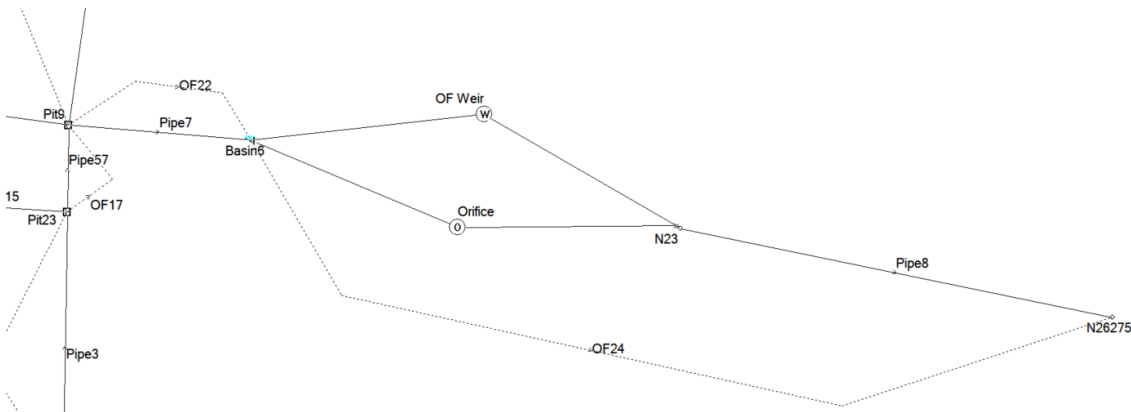
It is also worth noting that even though the ACOR report states a dual orifice staged discharge relationship was used to model the OSD, this is not reflected on their OSD details sheet, refer below. The detail seems to indicate only a single low-flow orifice outlet with an emergency overflow from the tank set at the 1% AEP level. If the OSD has been designed as a single orifice then this would likely account for the significant increase in volume.



Extract from ACOR drawing C1.05 showing OSD section detail

Subsequent to this Council RFI, Entec has reviewed our current DRIANS model and it is our opinion that our design is generally in accordance with Councils Water Management for Development Policy, noting the minor amendments as stated in response to comment 1 above.

The Entec OSD design incorporates a staged discharge by utilising a low-flow orifice, designed restricts flows during all storm events up to the 5% AEP, and a high-flow weir that allows water to flow over the weir during the 1% AEP. The DRAINS model has been detailed designed and models each pit and pipe with sub-catchments which subsequently discharges to the OSD. The OSD has been modelled using the full unsteady analysis within DRAINS which allows us to accurately model a staged discharge arrangement by utilising orifice and weir nodes. This allows us to clearly show the effect of both a low-flow orifice and a high-flow weir. The DRAINS model has been provided for Council review and subsequent approval.



**Weir Properties**

Name: OF Weir

Weir type:

- Rectangular (transverse)
- Rectangular (side spill)
- V notch
- Trapezoidal
- Parabolic (broad crested)

Cdisch: 1.74

Crest Elev (m): 159.47

Crest Length (m): 1.8 measured at right angles to direction of flow

**Orifice from Basin6 to N23.**

Orifice shape:

- Circular
- Rectangular

Name: Orifice

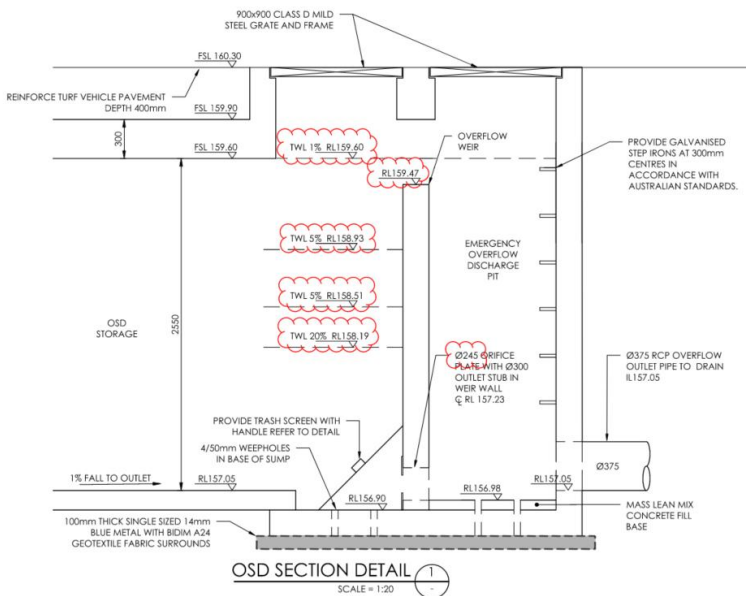
Cd: 0.61

Invert (m): 157.1

Diameter (mm): 245

Entec DRAINS model with low-flow orifice and high-flow weir design

This high flow wier allows the OSD to discharge more water during the 1% AEP whilst still achieving the Council requirement of restricting the post-development flow back to the pre-development rate for all storms up to the 1% AEP as shown below and detailed on our design drawings.



DESIGN CRITERIA	
CATCHMENT AREA =	7925m <sup>2</sup>
PRE-DEVELOPMENT IMPERVIOUS AREA =	0%
POST-DEVELOPMENT IMPERVIOUS AREA =	66%
PRE-DEVELOPMENT FLOWS (L/s)	
1% AEP	342
5% AEP	226
10% AEP	178
20% AEP	126
POST-DEVELOPMENT FLOWS	
1% AEP	341
5% AEP	161
10% AEP	145
20% AEP	126
OSD STORAGE VOLUME =	125m <sup>3</sup>

*Entec OSD design section with pre and post development flows*

In summary, a review of the ACOR DA stormwater report and drawings would suggest that their design restricts the 1% AEP flows more than is required by the Council policy. This would likely significantly increase the tank volume which could account for the discrepancy in volume between the two designs. We also note that the staged discharge arrangement noted within the ACOR design is not documented in the report or drawings and that the section detail on the drawings does not match this arrangement.

Entec does not have a copy of the ACOR DA Drains model, however, based on the above review it would seem that there are inconsistencies in the ACOR design that may also be contributing to the volume discrepancy between the two designs.

We have undertaken a review of our current OSD DRIANS design and consider it to be generally in accordance with Council requirements by restricting the post-development site discharge from all storms up to and including the 1% AEP to pre-development conditions.

The proposed modifications to the Regis Aged Care development therefore remain in accordance with Council's Water Management for Development Policy, including Section 5.5 and Appendix 3, and maintains the design intent of the previously approved DA stormwater management plans completed by ACOR.

Should you have any queries or wish to discuss, please do not hesitate to contact the undersigned.

Yours Faithfully

**ENTEC Consultants Pty Ltd**

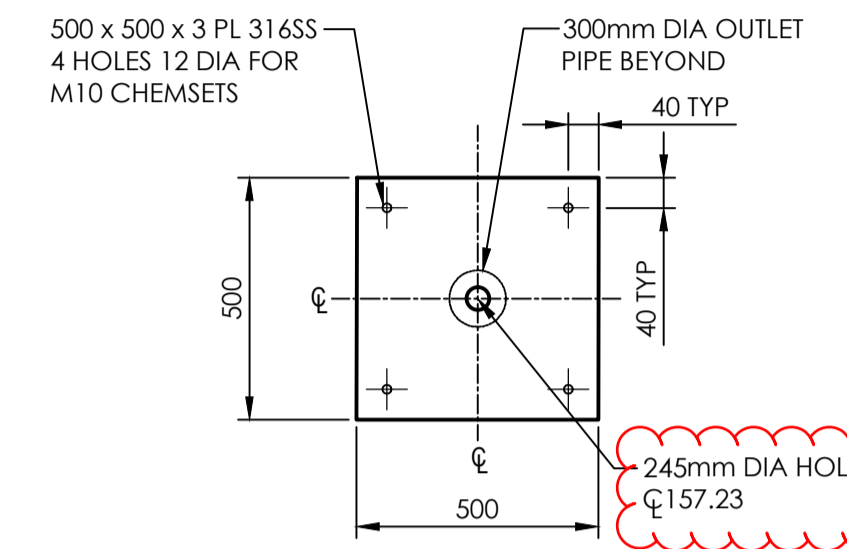
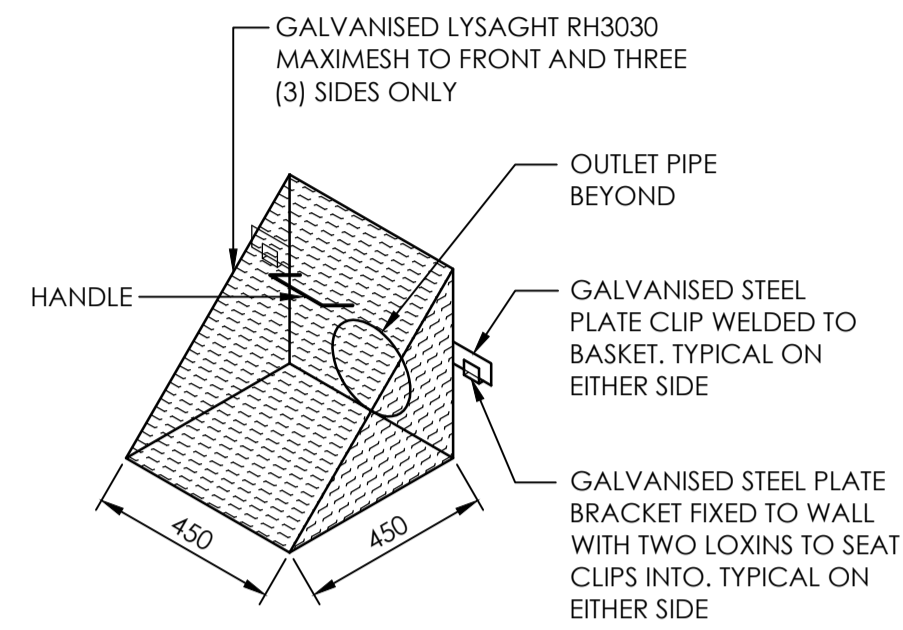
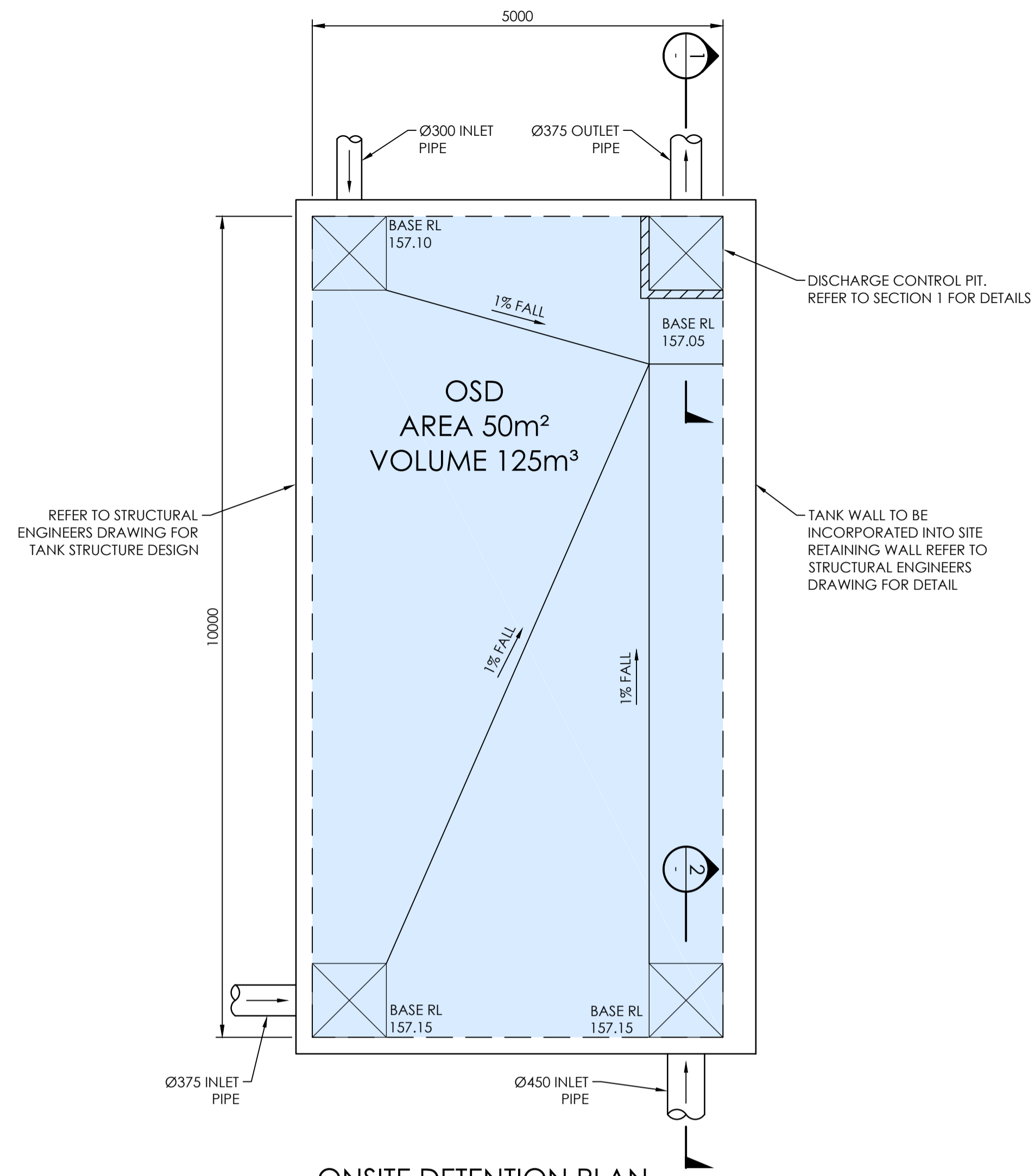
Nathan Pearce | Director – Civil

M 0423 438 873 | E [npearce@entec.com.au](mailto:npearce@entec.com.au)

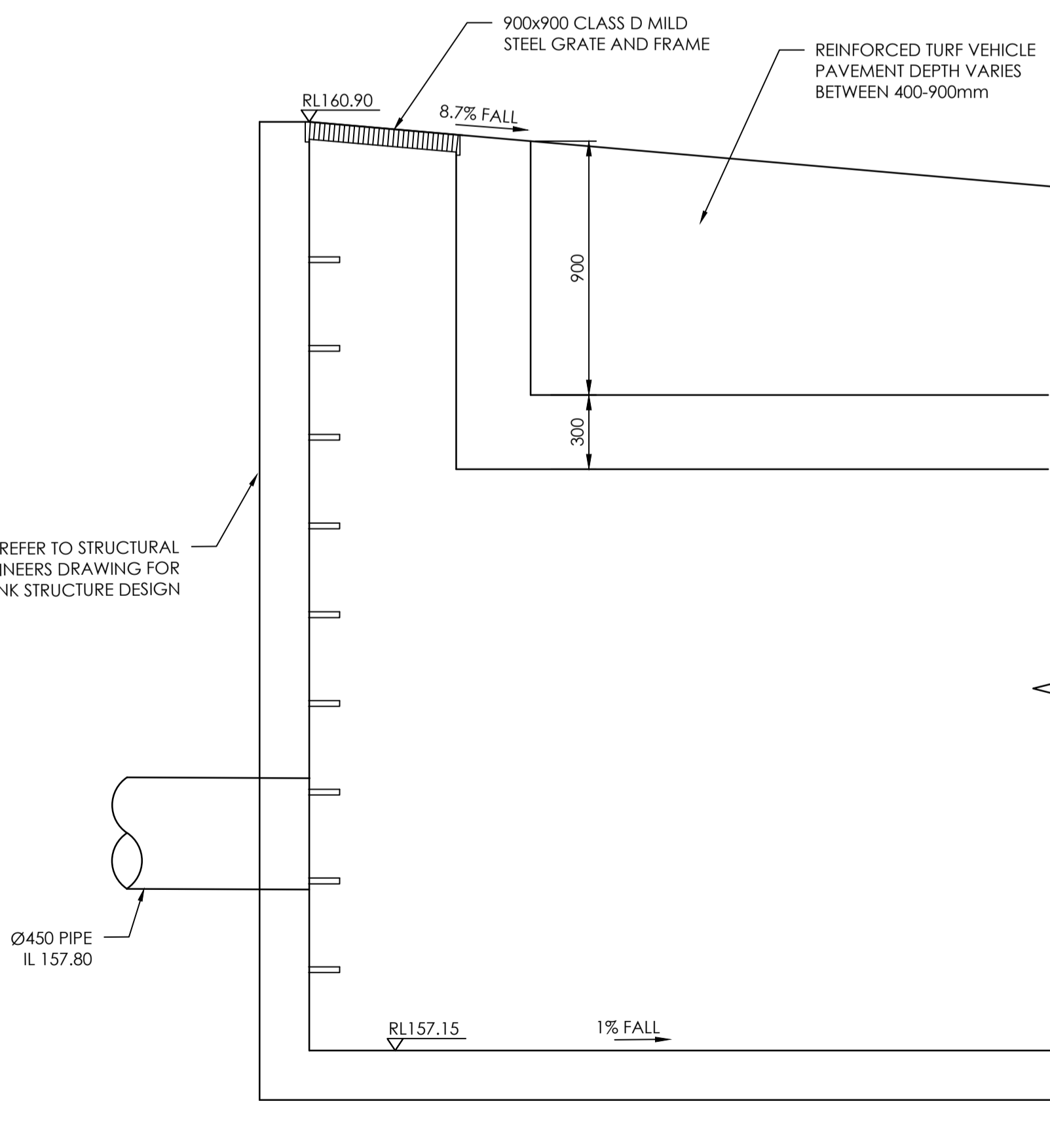
Encl: Attachment A - Revised OSD Section drawing C512, DRAINS Model

Attachment A - Revised OSD Section drawing C512

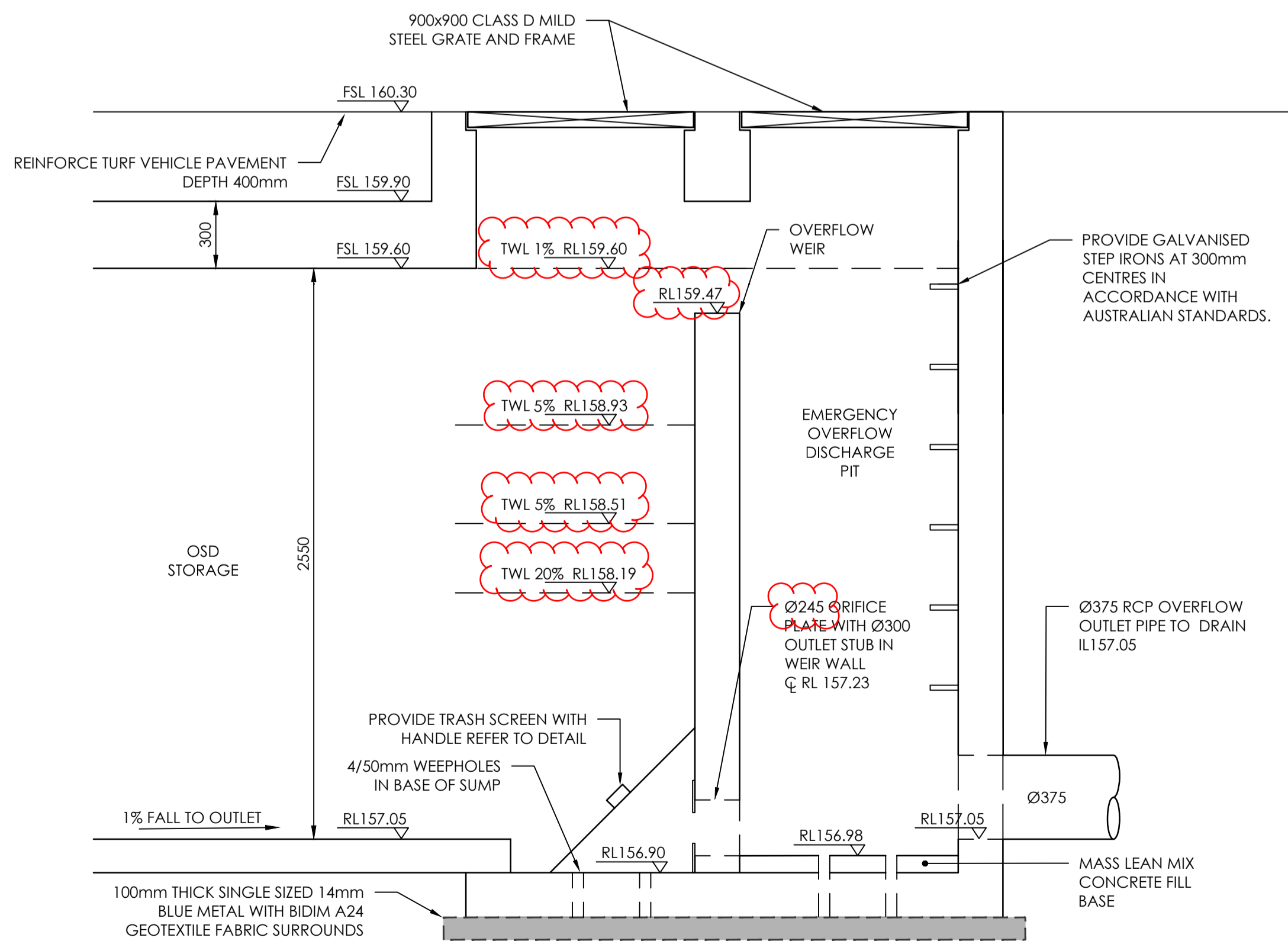
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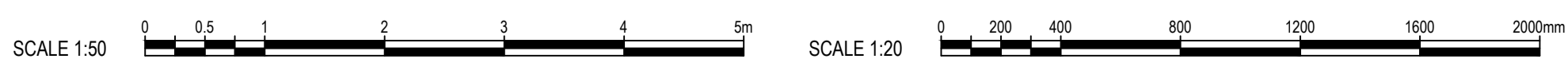
ONSITE DETENTION PLAN  
SCALE 1:50



OSD SECTION DETAIL 2  
SCALE = 1:20



OSD SECTION DETAIL 1  
SCALE = 1:20



TENDER ISSUE

NORTH POINT	
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ISSUE	AMENDMENT	DATE	DRAWN	APP
A	DRAFT TENDER ISSUE	30.10.23	JB	NP
B	70% TENDER ISSUE	10.11.23	JB	NP
C	COUNCIL COMMENTS	06.02.25	JB	NP

CLIENT  
**REGIS AGED CARE**

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ARCHITECT  
**mdp architecture**  
CIVIL ENGINEER

**ENTEC**  
CONSULTANTS

PROJECT  
**REGIS BELROSE**

181 FOREST WAY  
BELROSE NSW 2085

DRAWING TITLE  
CIVIL SERVICES  
STORMWATER DETAILS SHEET 3

DRAWN JB	DATE OCT 23	SCALE NTS	AI	QA CHECK NP	DATE
DESIGNED NP	PROJECT NO. 230074-01	DRAWING No. C512	ISSUE C		